XVIII. *On certain Facts in the Economy of the Cuckoo* (Cuculus canorus). By George Dawson Rowley, M.A.

I have lately made an analysis of the history of the Cuckoo (*Cuculus canorus*, L.) as given by various British authors, namely Yarrell, Morris, Gould, and Wood, and, lastly, of the article in the 'Naumannia' (1853, p. 307) by Dr. E. Baldamus. The latter appeared to contain matter of so much interest, that I obtained the assistance of a friend, and translated it. During the past year (1864) I received nineteen Cuckoos' eggs, most of which were seen by me *in situ*. In 1863 I obtained not quite so many; but in former years my opportunities have not been neglected. With these materials, and after much careful observation for many years and in a good locality, I venture to say a few words on the breeding of *Cuculus canorus*.

Yarrell says that "the earliest egg does not appear to be laid till the middle of May;" and Mr. Morris follows him in the same statement. Now, in the 'Ibis' for 1862 (p. 384), I recorded the fact that a fresh egg of the Cuckoo was found on the 5th of May of that year, in an otherwise eggless nest of *Fringilla chloris*, by a friend of mine, while hunting for nests in my company; and I have in my collection a series of specimens, with the nests in which they were deposited, from the date just mentioned down to the 19th of July 1864; on which day the nest of a Titlark (*Anthus pratensis*) was taken at Stanmer near Brighton, by a person on whom I can rely, which contained five eggs of that bird, and one of a Cuckoo, so small as hardly to exceed them in size by any perceptible difference. I have myself taken eggs of the Cuckoo in July; but the 19th is the latest date known to me. Hence I may fairly say that the period of laying, with this bird, extends from the beginning of May to the middle of July, as proved by facts which have come to my own observation.

Mr. Morris goes more into detail than any other author with whose books I am acquainted; and I find that many of my observations confirm his remarks. Mr. Gould, in his magnificent work on the 'Birds of Great Britain,' gives much information on the subject. He draws attention to the article in the 'Naumannia,' which I have mentioned above, but without passing an opinion on the theory it contains. Before the part of his work treating of the Cuckoo had reached me, I had already in some degree considered this article (*vide* 'Ibis,' 1862, pp. 384, 385), upon which I now propose to make a few remarks. Mr. Wood also appears to allude to it when he says that "the colour of the egg [in *Cuculus canorus*] varies with the species in whose nest it is to be placed."

The translation of Dr. Baldamus's article is too long to be inserted here, though it would be much more satisfactory if English readers had the opportunity of studying it in their own language. I must therefore content myself with giving one or two of his leading observations, and a statement of his final results. But now let me say that, though I am not at present convinced by his arguments, tending as they do to a conclusion quite contrary to my own experience, yet I cannot refrain from expressing my admiration at his researches, which of themselves bear witness to his reputation as an ornithologist. The theory is as beautiful as it is new, and I only wish that fresh evidence may be brought forward of a nature so strong as to make it an acknowledged fact. Till that, however, is the case, I am compelled to withhold my belief from it. After detailing his efforts to discover if the Cuckoo is polygamous, the author gives, from Thienemann, a list of the various species in the nests of which its egg has been found, as follows:—

Sylvia hortensis.
—— cinerea.
—— atricapilla?
—— curruca.
—— tithys.
—— phœnicurus.
—— rubecula.
—— arundinacea.
—— palustris.
—— cariceti.
—— locustella.
Sylvia trochilus.
Accentor modularis.
Troglodytes vulgaris.
Saxicola rubetra.
Motacilla alba.
—— flava.
Anthus campestris.
—— pratensis.
Alauda arvensis.
Emberiza citrinella.

To these Dr. Baldamus is enabled, from other sources of information, to add:—

Lanius collurio.
Sylvia nisoria.
Luscinia luscinia.
Hypolais vulgaris.
Phyllopneuste rufa.
Calamoherpe turdina.
—— phragmitis.
Regulus flavicapillus.
Anthus arboreus.
Alauda cristata.
—— arborea.
Emberiza miliaria.
—— schœniclus.
Loxia chloris.
Linota cannabina.
Saxicola stapazina.

In addition to this list, I may also quote the evidence afforded by a nest of the Brambling (*Fringilla montifringilla*), received by me from Archangel, which contained five eggs of that bird, and one of the Cuckoo*.

Out of nests of the thirty-seven species mentioned above, Dr. Baldamus says he has obtained about one hundred eggs, collected by himself and his friends, so that he has "plenty of material." He then proceeds to give descriptions of these specimens; and the most astounding among them is that of a supposed Cuckoo's egg, found in the nest of *Accentor modularis,* without the usual spots of the former, but of a "fine blue-green colour." Now, I venture to ask, what proof exists, or can exist, other than the *hatching of the egg,* to convince an oologist that it was a veritable Cuckoo's? Was it not rather a monstrous variety of that of the *Accentor*? I have at this moment before me a sitting of five fresh eggs of *Salicaria arundinacea,* taken near the river Ouse, in Huntingdonshire, on the 10th of June 1864, by my father's game-keeper, a man of long-proved exactitude. The fifth, precisely like the others in colour and markings, is of the size of a small Cuckoo's egg in my collection; yet do I entertain the least doubt as to its origin? Certainly not. It is unquestionably an egg of *S. arundinacea.* I really am afraid to say how many eggs of Cuckoos' I have found in the nests of this bird in the course of my annual experience; but in no one instance can I trace the smallest resemblance, or tendency to resemblance, between the eggs of the two species. The same is the case with Cuckoos' eggs found in the nests of *Accentor modularis* and *Salicaria phragmitis,* of which I myself have discovered many. In one instance, on the 30th of June 1862, I found a remarkable Cuckoo's egg in a nest of *S. phragmitis,* together with two of that bird's. This differed much from the usual type of the Cuckoos' eggs found by me in the valley of the Huntingdonshire Ouse, round St. Neot's; but instead of the divergence in colour and markings approaching to those of *S. phragmitis,* the result was to make the difference much greater and more conspicuous.

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* The list of species which foster the Cuckoo might, we believe, be very much further extended. Without pretending to give an "exhaustive" list, we can add to those noticed above, on fair authority, *Passer domesticus.* Pallas (Zoogr. R.-Asiat. vol. i. p. 481) mentions *Cyanecula suecica*; Yarrell, *Anthus obscurus, Fringilla cœlebs,* and *Turdus merula*; Mr. Hewitson, in his last edition, *Locustella nævia* (Bodd.); while M. des Murs, in his great work (Oologie Ornithologique, p. 219), includes *Parus major, Anthus cervinus* (apparently, since he calls it "Pipit Rousseline", by mistake for *A. rufescens* sive *campestris,* already mentioned by Thienemann), *Acanthis linaria, Pyrrhula rubicilla, Garrulus glandarius, Turdus musicus,* a *Pica,* a *Turtur,* and a *Palumbus,* all among the birds to which the education of young Cuckoos is occasionally entrusted. We can entirely confirm Mr. Rowley's statement of Cuckoos' eggs being found in nests of *Fringilla montifringilla,* nearly half a dozen instances of such an occurrence being known to us.—Ed.

Of the cases quoted by Dr. Baldamus, that which rests on the strongest evidence is a Cuckoo's egg, in the nest of *Hypolais vulgaris,* resembling those of that bird. Herr Braune shot the Cuckoo when leaving the nest, and took out of her another egg, ready for exclusion, and similar in colour to the one deposited. This testimony appears to be strong, and I therefore cite it here; but I think that eggs taken out of a bird by dissection are not to be relied on as showing the matured colour. I do not, however, wish to underrate the value of this instance.

Another egg, described by Dr. Dehne ('Naumannia,' 1853, p. 203), was laid by a Cuckoo in a cage, and was destined, as Dr. Baldamus thinks "very likely," for the nest of *Ruticilla tithys.* Now we all know that the eggs produced by captive birds cannot in the least be depended upon. I have several very curious specimens which illustrate this point.

Dr. Baldamus says it is a fact without doubt "that there are Cuckoos' eggs which in colouring and marking are like the eggs of those *Sylviidæ* in whose nests they are laid," that nature has regulated these circumstances to "make easier the existence of the species" and that the *Sylviidæ* then become "blind" with regard to the Cuckoos' eggs. One would hardly think it necessary for Nature to do this, since we well know that most birds will lay to an egg of another species introduced into their nests, and frequently to a round stone, not to say a boy's marble; indeed I have observed a *Muscicapa grisola*, having lost her eggs, sitting hard for two days on an empty nest. The impulse to sit is so strong as to be very difficult to resist. I have frequently, and (so far as sitting goes) with success, changed the eggs of birds. Not long since I substituted three eggs of *Fringilla cœlebs* for the same number of a *Coccothraustes vulgaris*, to which the latter laid two more very contentedly. But I need not cite more examples, for similar instances have probably occurred to most oologists.

If, then, *Cuculus canorus* has this strange and (as I think) unnecessary property, does the same gift extend, under a similar necessity, to the equally parasitical *C. glandarius*? Unfortunately I have only one specimen of the egg of this species, sent with three companions, the property of *Corvus cornix*. One specimen certainly does not tell us much; but I see nothing to favour the supposition alleged. Again, does the Australian *Scythrops novæ-hollandiæ* deposit an egg in colour resembling that of *Gymnorhina tibicen**, which, according to Mr. Gould, is sometimes its foster-parent? The more honest habits of the Cuckoos of the New World prevent our getting any help from them.

The ingenious idea struck out by Dr. Baldamus, and recorded of old time of animals about to produce young, that strong and long-wearing impressions upon the senses affect the female bird with regard to the colour of her eggs, can hardly, I think, be entertained. It is true that the colouring is the last stage in the egg-making process; but how does a Cuckoo know what hue will be suitable, when she deposits her egg in an empty nest? That this is sometimes the case, I fully believe. I refer again to my nest (already mentioned) of the 5th of May 1862. But it may be said that, in that instance, the Cuckoo turned out all the eggs of the *Accentor* and only left her own. Now I have very frequently known the Cuckoo turn out some eggs, but never, according to my experience, have the whole been ejected.

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* Dr. George Bennett states (P. Z. S. 1861, p. 183) that the eggs of this species vary among themselves most remarkably.—Ed.

So violent a proceeding might defeat her end, by causing the desertion of the owner.

I have made notes of several cases where I have the best reason for saying that the Cuckoo turned out one egg with the intention of laying, and then, from some cause or other, did not ultimately insert her own—in short, prepared a nest, but perhaps had not an egg ready for exclusion at the time. For a long while this used to puzzle me much. I have frequently met with such a case; in fact, I do so every year. Last season I had watched a Cuckoo so closely, that I was positively certain she must lay somewhere near. I had also searched so much, that I felt sure there was no nest ready at hand except a Reed Bunting's (*Emberiza schœniclus*). To this I devöted myself, as for years past I have wished to obtain a Cuckoo's egg in the nest of this species, of which perhaps I annually look into some five-and-twenty, and that in a place frequented by Cuckoos. At last I said, when the Cuckoo hung round this tempting nest, that I must be sure of the specimen I wanted. Three Bunting's eggs were laid—the next morning there were only two to be found. The Cuckoo had, as usual, turned out one or two, but she, herself, would not lay, because, as I conclude, she did not like the species. The nest of this bird, which I should have thought very suitable, is, according to my experience, the one least used by the Cuckoo. Dr. Baldamus includes the species in his list; but, I believe, instances must be rather rare.

If I interpret Dr. Baldamus rightly, he says that all the eggs of one Cuckoo are the same in colour, and are all destined for the nests of one and the same species; but that these are often not ready, therefore the bird is compelled to dispose of them as may chance, and consequently to a disadvantage. In the valley of the Ouse, which I watch with great care, I know that the Cuckoo usually lays in the nests of *Salicaria arundinacea*, but very nearly as often in those of *S. phragmitis*, the contents of the two being, as all oologists are aware, very different. I have found two types of Cuckoo's eggs, laid, as I am nearly sure, by the same bird. Dr. Baldamus alleges that the eggs which do not agree with his theory are exceptional. I would suggest, however (and the numerous examples I have taken warrant the idea), that the Cuckoo's eggs, which differ in colour and marking from those of the owners of the nest in which they are found, are normal, while his specimens are accidental—in short, exactly the contrary to what he advances. Some of the figures which he gives in his plate ('Naumannia,' 1854, p. 415), I take to be simply monstrous eggs of the several birds in whose nests they were discovered. The author justly remarks that numbers prove a rule, and takes his stand upon his hundred specimens. I cannot now produce quite so many, but perhaps could nearly equal him in the number taken by our respective hands *in situ*.

Dr. Baldamus admits that the two types of coloration in the eggs of the Cuckoo, which are known to all oologists, namely the red type and the grey, are found in most localities; and, with some slight variation (induced, perhaps, by exhaustion or other similar physical causes), I cannot imagine any other sort of coloration. But if such polymorphism be found in eggs of the Cuckoo, they can scarcely surpass in variety the eggs of *Anthus arboreus*. For what purpose then, I may ask, was this most extraordinary variability given to the Tree-Pipit, which is certainly not a parasitical species?

The author concludes his most interesting and clever paper by laying down fourteen Canons, which I here repeat, adding to each my own comment upon it.

1. "The Cuckoo deposits its eggs for incubation with a great number of Warblers."—True.
2. "There are Cuckoos' eggs of such different coloration and marking, as are found in no other bird, so far as is known up to this time."—To this I do not agree.
3. "All the eggs of the Cuckoo, even those of the most varied colouring, find a resemblance, alike in coloration and marking, among those of the foster-parents."—I do not agree.
4. "Peculiar colouring prevails in different localities."—True.
5. "Each hen Cuckoo deposits only one egg in the same nest."—True.
6. "Eggs (as a rule) are deposited only in such nests as already contain eggs of the foster-parents."—Usually the case, but by no means always, as I believe.

7. "The same hen-bird deposits eggs of a like colour (as a rule) in nests of the same species."—Not always the case.

8 "The exceptions to the last four conclusions are proportionately rare."

9. "Most of the Warblers desert their nests readily, and in consequence of very slight disturbance."—True.

10. "They pursue and drive away the Cuckoo when it comes near them."—This leads to a contest, in which the eggs are sometimes broken.

11. "The Cuckoo avails herself of the absence of the old birds when depositing her egg in the nest."—Certainly.

12. "She lays her egg on the ground and conveys it with her beak into such nests as are otherwise inaccessible; but, when opportunity affords, she lays it in those that are easily accessible."—This I believe, but I myself have no actual experience of the matter.

13. "In consequence of this, she lays aside her usual shyness of buildings."—This I can confirm; I know of a young Cuckoo hatched in a cart-shed some years ago

14. "Two Cuckoo's eggs of different colours occur in the same nest. Whence we infer:—

"(1.) Nature must have an especial purpose in so many harmonious and peculiar contingences.

"(2.) This purpose is very easy to understand: under the arrangements originally hit upon, nature would make surer and easier the existence of the otherwise endangered species.

"(3.) Nature attains her purpose by very simple means. She has granted to each hen-Cuckoo the faculty of laying eggs, in colour similar to those of the birds whose nests she has, according to the locality, been accustomed to use; or, in other words, each hen-Cuckoo lays eggs of a certain colouring only, which corresponds with that of the eggs of some one species of Warbler, in the nests of which she deposits them, and she only puts them into the nests of other species when, at the time she is ready to lay, a nest of her (so to speak) typical species is not at hand."

To the inferences, from this fourteenth and last conclusion, I do not, of course, assent, except as to the fact of two eggs of different colourings being found in the same nest.

I would add, from my own experience, the following results:—

I. The period of laying, in the Cuckoo, extends from the 5th of May to the 19th of July, or nearly.

II. Traces of violence and a scuffle between the Cuckoo, at the time of deposition, and the owner of the nest often appear.

III. It is not usual to find the full complement of eggs of the proprietor in the nest after a Cuckoo has intruded hers. But sometimes the contrary occurs.

In exemplification of the above, I give the following list of nineteen nests containing Cuckoos' eggs known to me during the past year (1864): —

Date.	Name of owner.	No. of eggs of owner.	Remarks.
May 22.	Accentor modularis ...	3	On the 21st there were three eggs. Next day the Cuckoo laid; still only three eggs of the owner.
24.	,, ,,	1	Contained one egg of the owner smashed (not sucked); the moss was torn, but the Cuckoo's egg sound and fresh.
30.	Salicaria arundinacea.	2	Incubated.
30.	,, ,,	2	
June 1.	Motacilla yarrelli	4	I watched this from the first. It contained four eggs of the owner. The fifth was turned out, and lodged in the tree in which it was built.
3.	Anthus pratensis	5	
4.	Salicaria arundinacea...	2	
6.	,, ,,	1	
8.	Accentor modularis ...	0	
9.	Salicaria arundinacea..	3	
11.	,, ,,	0	
13.	,, ,, (?)	1	On the 12th it contained two eggs of owner. On the 13th it had only one, with a Cuckoo's added.
14.	,, ,,	0	The Cuckoo's egg had sticking to it a portion of another Cuckoo's egg, exactly the same in colour and markings, whence I conclude there had been a battle between the two birds, when all the contents were broken, except one Cuckoo's egg—perhaps that of the victor.
15.	,, ,,	1	
23.	Accentor modularis ...	1	
23.	Salicaria arundinacea..	1	
25.	,, ,,	2	
July 19.	Anthus pratensis	5	Incubated.
——	Motacilla yarrelli	—	This nest, built in a wood-stack, contained two Cuckoo's eggs, one red, the other grey.